

**The Assembly of the 65 mA LEBT Electrode Structures,
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This note is a collection of photos documenting the procedure used to assemble the Low Energy Beam Transport (LEBT) structure after replacing some electrodes and apertures in order to allow the LEBT to transport a 65 mA H⁻ beam. This process took place July 2000. The photos shown are intended to be a guide for future maintenance during the LEBT's operation. The procedure documenting the disassembly is covered in a separate technical note (see FE-ME-037).



Figure 1. The new ground (G4) electrode, placed on “1-2-3” blocks.

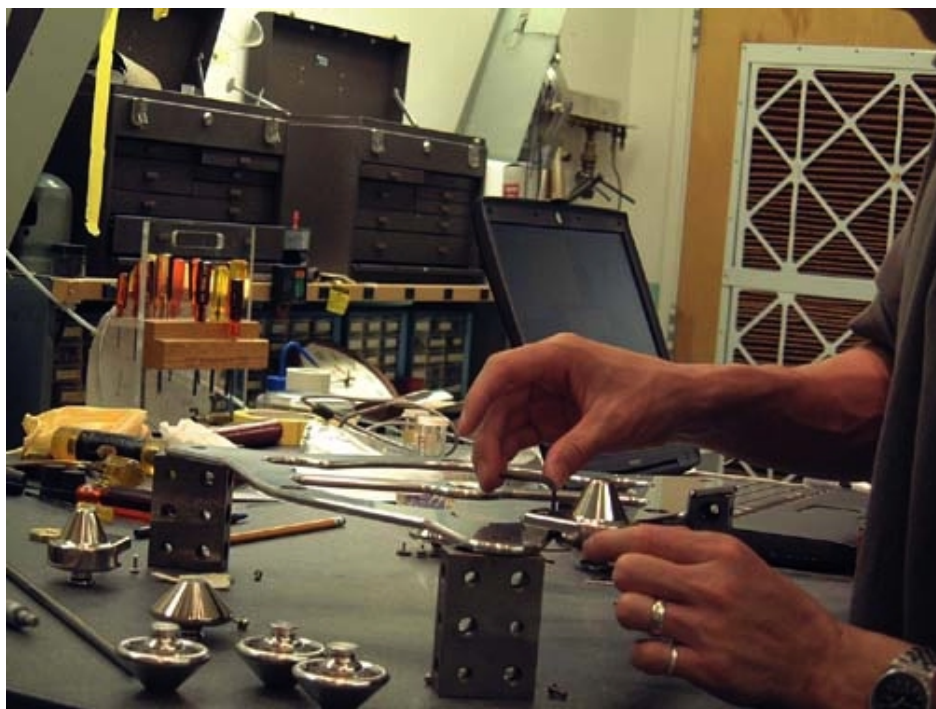


Figure 2. The chopper insulator shields were installed first, in the same orientation as they were removed from the old LEBT. Shims were used to space them correctly.

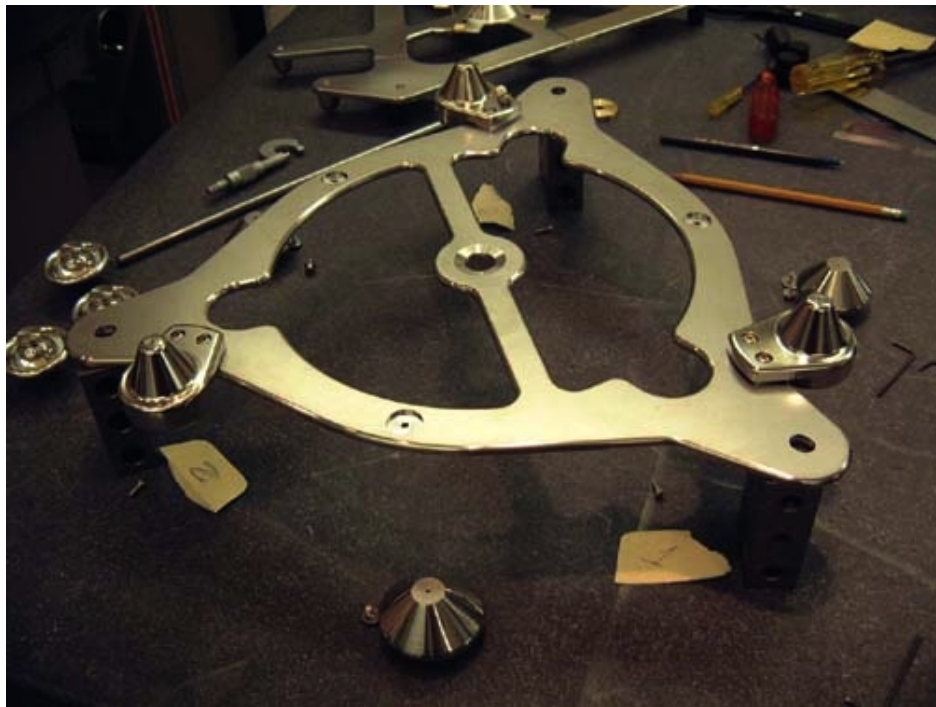


Figure 3. The ground (G4) electrode, with the chopper (G5) electrode insulator shields installed.

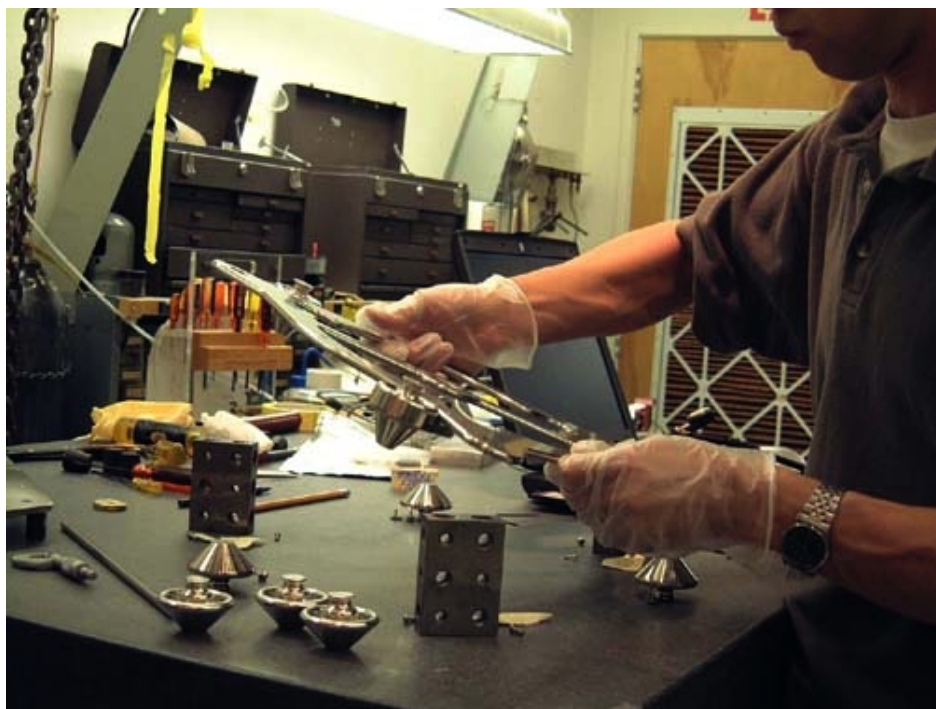


Figure 4. The assembly was then flipped over.

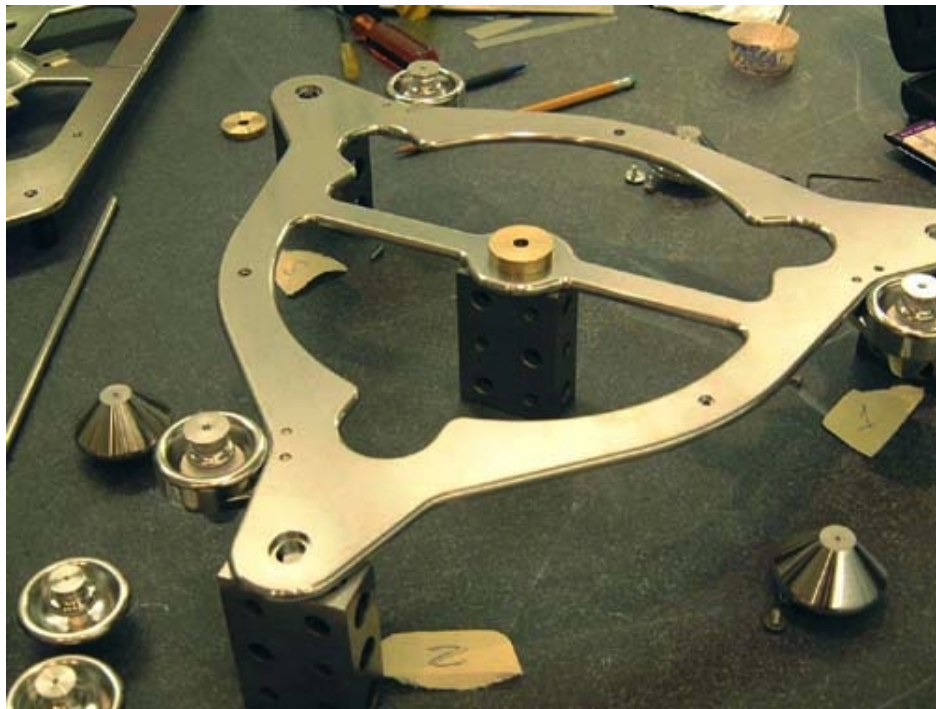


Figure 5. Another “1-2-3” block was placed underneath the aperture of G4 in order to support the weight of G5 during installation.

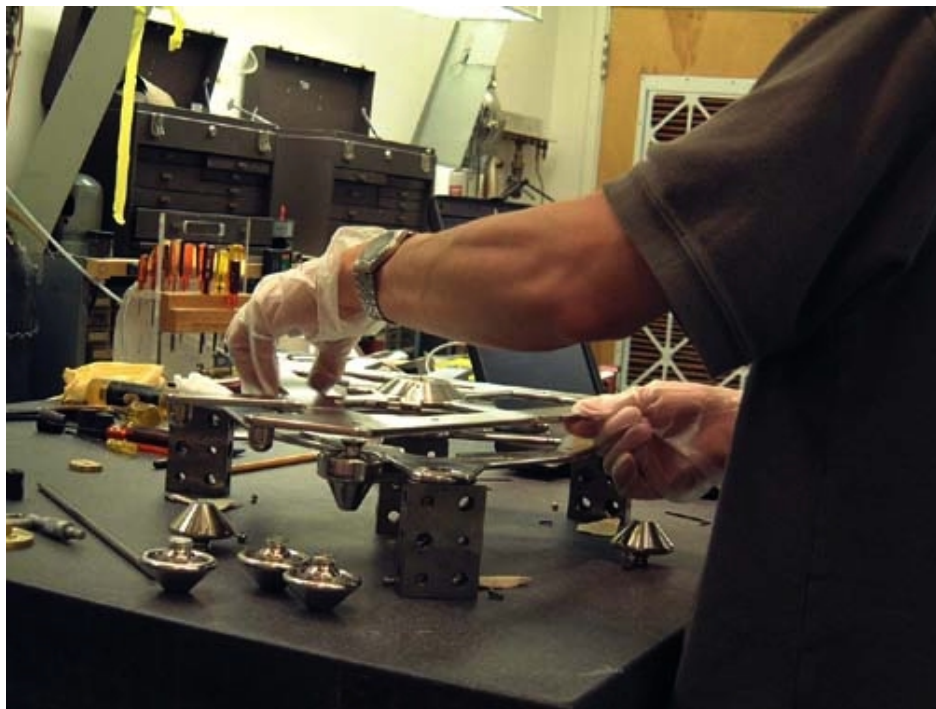


Figure 6. The chopper electrode was placed onto the brass spacer, confirming the required length of the insulator/insulator shields.

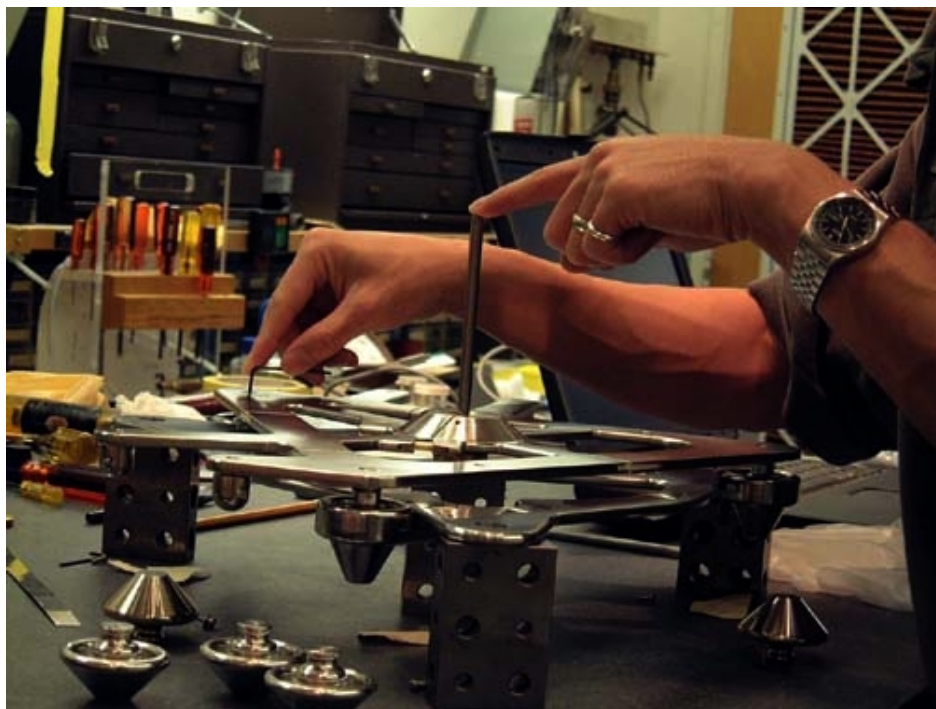


Figure 7. The alignment rod and brass sleeves were used to ensure alignment prior to tightening down the chopper electrode.

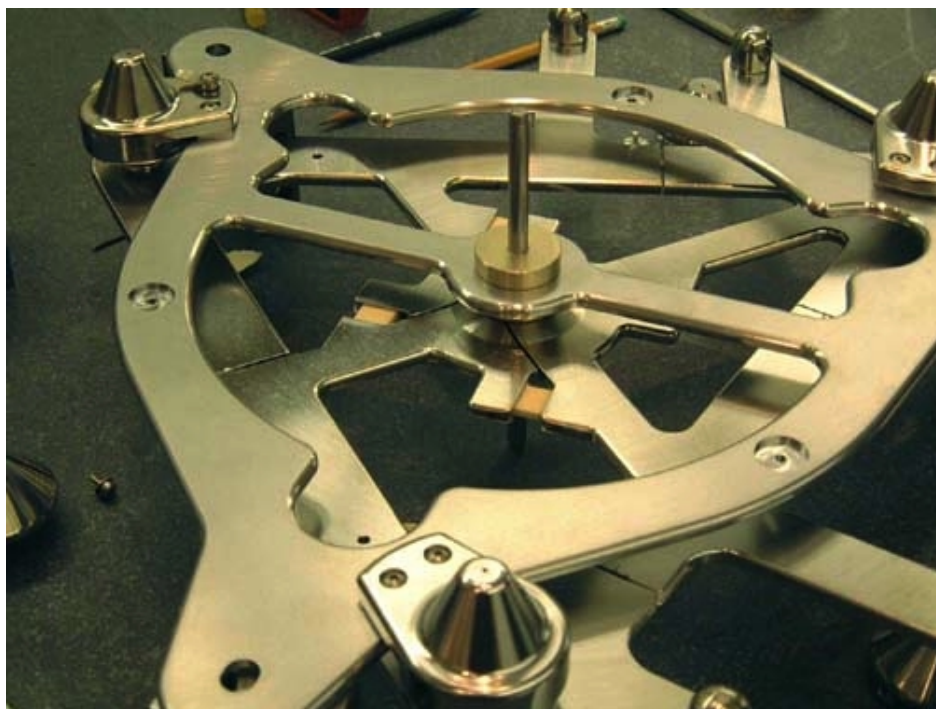


Figure 8. The assembly was flipped over again (having removed the “1-2-3” block support from the aperture), and the brass spacer was placed on the G4 lens to ensure correct spacing for the first lens (G3).

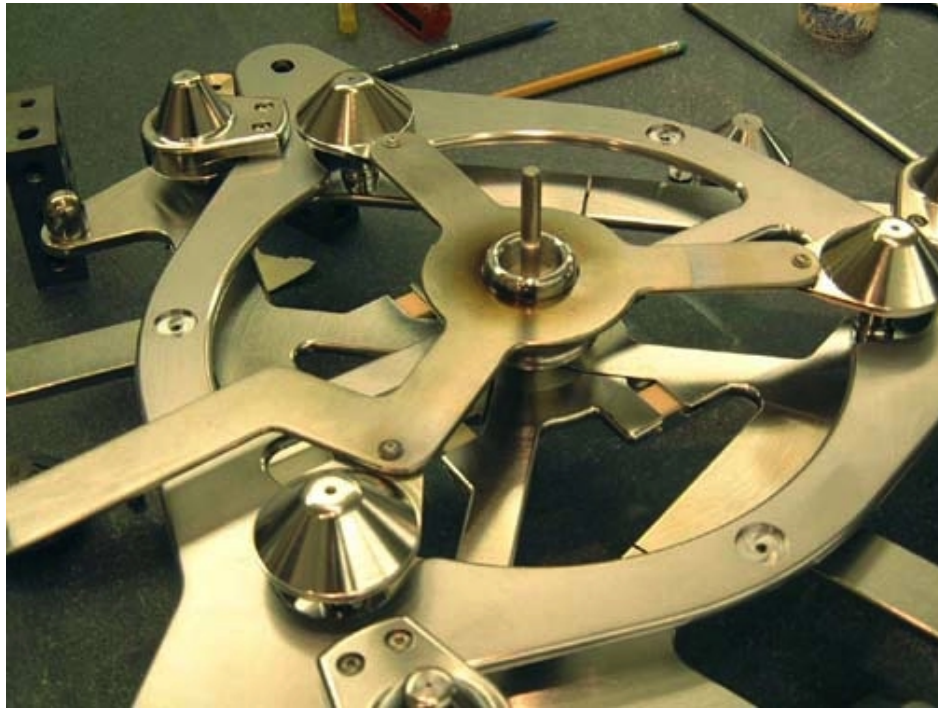


Figure 9. The G3 lens was then set down, with the brass sleeve at the aperture for alignment, and shims were placed under the shields where necessary.

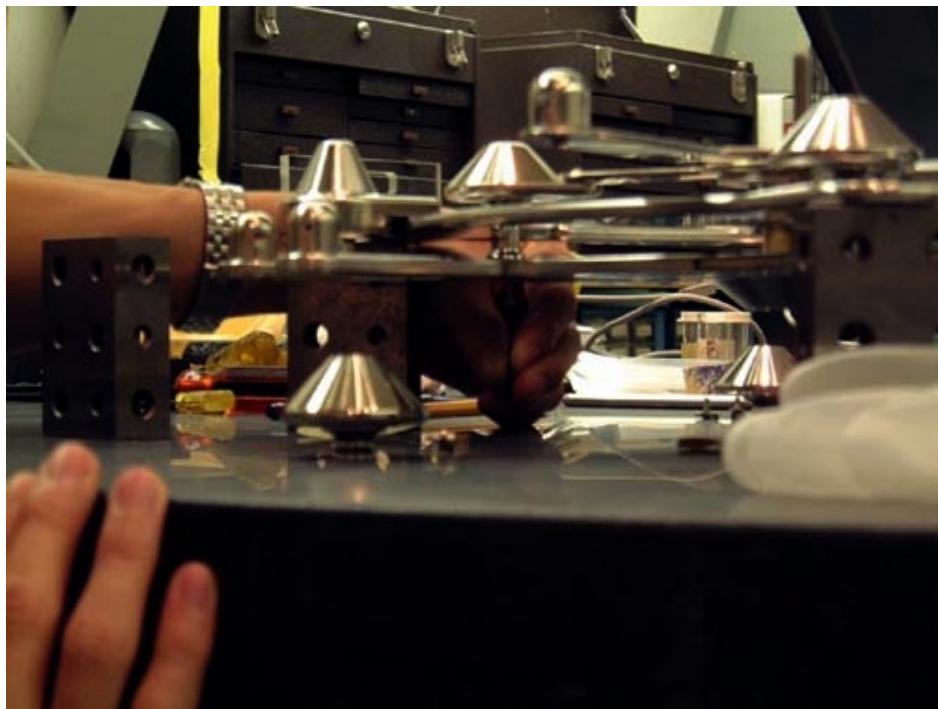


Figure 10. The bolts were then tightened from the bottom of the assembly to fix its position.

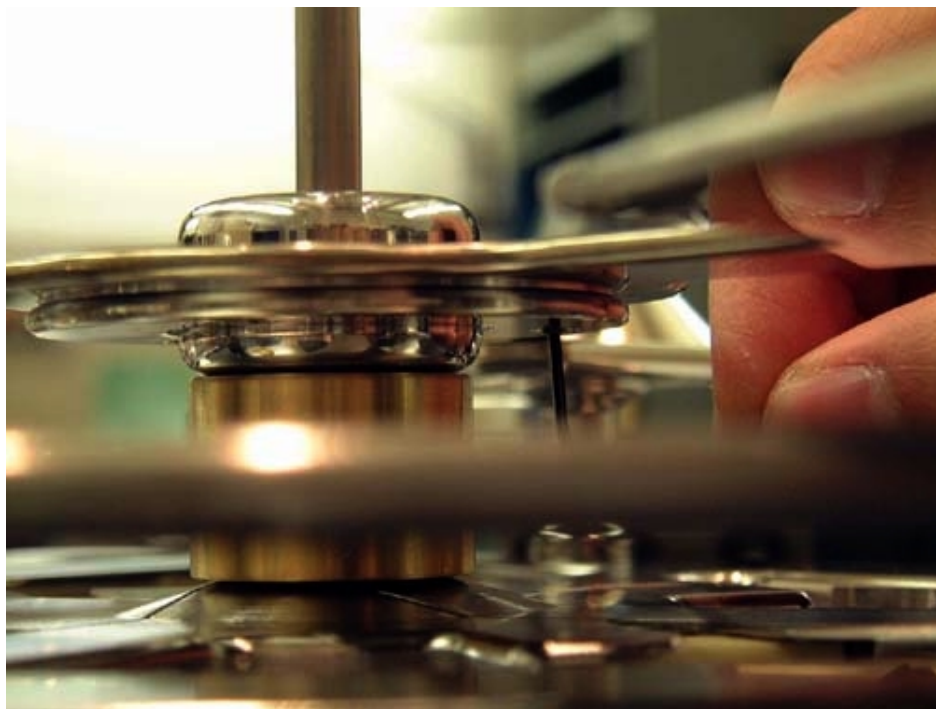


Figure 11. Then the aperture clamp ring bolts were tightened as well, to fix the aperture's alignment and position.



Figure 12. The brass spacer was then placed to ensure the correct standoff of the extractor electrode.



Figure 13. The new extractor insulator assemblies were then measured in preparation for installation. This was the rough starting point of what thickness shims were necessary to install.



Figure 14. The extractor electrode was leveled on the spacer, and the gap between the electrode legs and the insulator shields was measured.



Figure 15. The necessary shims were placed where needed.



Figure 16. Then the bolts were tightened from the bottom to set the position of the extractor insulator shields.



Figure 17. Shoulder screw used to attach the extractor electrode to the insulator shields, with the wave spring washer.



Figure 18. Flat washer placed onto wave-spring washer.



Figure 19. Shoulder screw and washers were tightened onto the extractor's insulator shields



Figure 20. The aperture clamp screws were then tightened, setting the alignment of the aperture in the correct place.

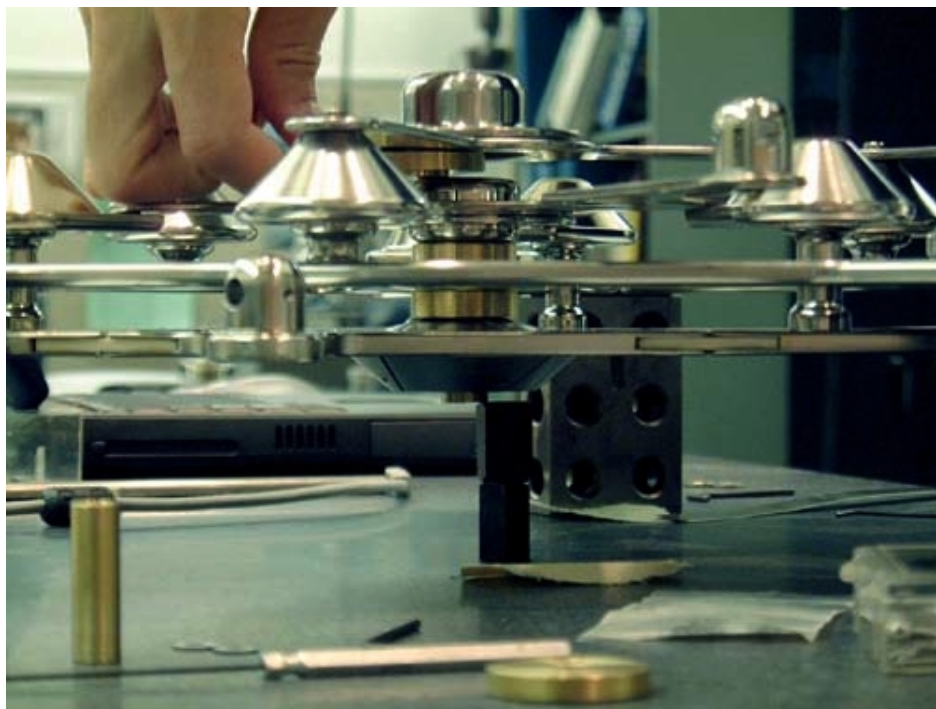


Figure 21. The alignment rod and spacers were then removed.



Figure 22. The LEBT assembly was then placed onto main insulator standoffs on the reentrant cylinder.



Figure 23. This picture shows a detail of the slot and spacer prior to inserting the bolt. The thickness and spacing were set with more shims/washers as needed.



Figure 24. The screws were then placed, finger-tight.



Figure 25. After confirming the alignment of the LEBT, the screws were then tightened.



Figure 26. The completed LEBT and reentrant cylinder assembly, side view.

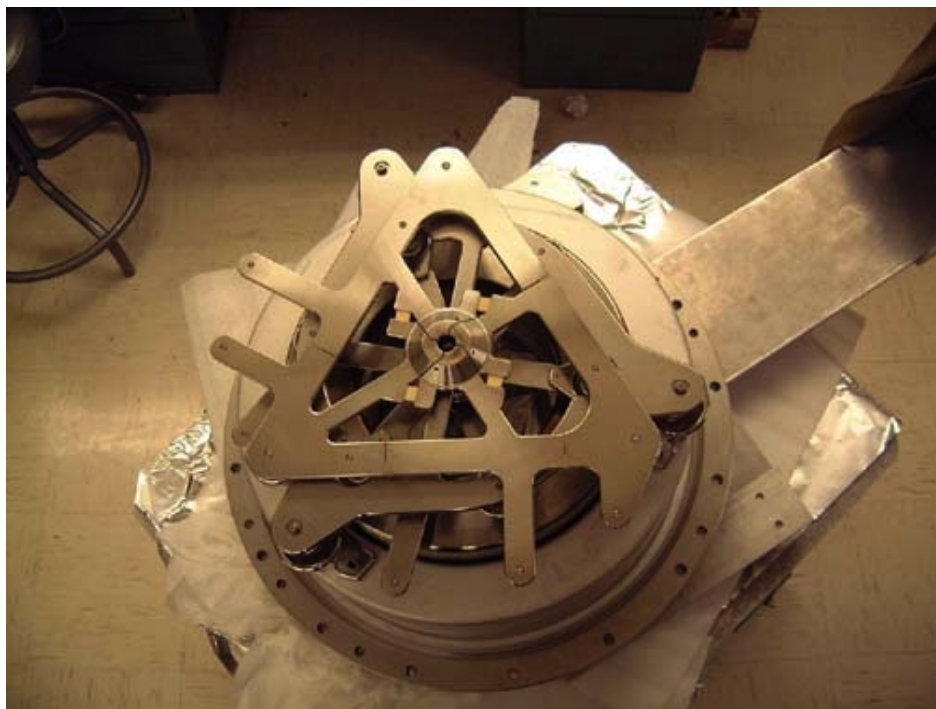


Figure 27. The installed LEBT from front